

EPA Comments on
SUBSURFACE INVESTIGATION WORK PLAN for
MAYFLOWER MILL & TAILINGS IMPOUNDMENTS AREA

EPA has reviewed the “Subsurface Investigation Work Plan for the Mayflower Mill and Tailings Impoundment Area” submitted by Sunnyside Gold Corporation (“Sunnyside”) on July 14, 2015. At the same time, Sunnyside submitted a separate work plan for “Surface Water, Groundwater and Solid Phase Media Investigation Work Plan of the Mayflower Mill and Tailings Impoundment Area.” While Sunnyside submitted them as separate work plans they are related.

1. In reading the work plan it is not clear from the plan how the data collected under this work plan will be used. If a water bearing or bacterial community is identified, how will this information be used in decision making or to guide further data collection activities.
2. The work plan also states that the groundwater wells will be sampled based on the results of the subsurface investigation, but the work plan does not discuss how the wells will be selected for sampling.
3. Sunnyside included a Quality Assurance Project Plan/Sampling and Analysis Plan (QAPP) as an appendix to for the work described in each work plan but did not submit a Crosswalk for either QAPP. EPA requires the preparer of the QAPP to submit a Crosswalk to aid in its review of a QAPP. Since Sunnyside did not submit a Crosswalk, EPA as part of review has completed the Crosswalk and provided its comments concerning the QAPP the Crosswalk. It is requested that Sunnyside provided an explanation for how it addressed each deficient item noted in the Crosswalk including the comments in the “Summary of Comments” and re-submit the Crosswalk when it resubmits the revised work plan including the QAPP. The “Response” date and “Resolved” date should be included in the Comments section of the Crosswalk.
4. Significant concerns with the QAPP include the following items:
 - All SOPs including Laboratory, Sampling Disposal (SOP3) and the Laboratory QMP need to be included as appendices to the QAPP.
 - A timeline of activities should be provided.
 - Information on indirect measurements should be included.
 - Signature lines for EPA’s approval (if we enter into an AOC) as well as Sunnyside approval, distribution list, DCN (document control number) and Revision number were also missing.

Additional comments on the overall work plan are as follows:

5. **Page 2-1, Section 2.0 Background** – Please provide more discussion on the types of materials besides tailings that were disposed of in the tailings impoundments and their likely location. Were the locations for disposal of these other materials documented?
6. **Page 3-2, Section 3.2, last bullet**, “Would another question be whether microbial populations catalyze and increase metal mobility rather than limit metals migration?”
7. **Page 3-3, Section 3.4, DQO Step 4** – How would it be decided to expand the spatial

boundaries of the study area, i.e., what criteria might be considered?

8. **Page 3-3, Section 3.4, last paragraph**, “This temporal boundary limited to July - October 2015 may be too short to accomplish the data objectives. Although sample collection during field conditions prevailing during the summer-fall 2015 may be scientifically preferable, extending the sample collection into the 2016 field season should not be ruled out.”
9. **Page 3-3, Section 3.5, first paragraph**, “How will sample design facilitate the collection of representative samples?”
10. **Page 4-0, Section 4.2 and Figure 4-1**. The locations of borings are limited to within the impoundment areas. Consideration should be given to placing borings outside the impoundment areas. This may be required to meet the DQOs listed in the SW, GW, and Solid Phase Media Investigation Work Plan. One of the DQOs suggests that upgradient water will be sampled and evaluated. See comment #4 on that WP.
11. **Page 4-0, Section 4.1** – Please provide the other target analytes to be analyzed and discuss the reasons for analyzing them.
12. **Page 4-0, Section 4.2**, “Can this plan estimate the expected total depth for these boreholes based upon the permitting or as-constructed tailings deposition records?” The Work Plan states that boreholes will be advanced to bedrock (if possible). The approximate depth of bedrock is likely known in the area. Likewise, a maximum depth will be imposed by the drilling subcontractor due to the availability of materials (casing, etc.). Therefore, EPA suggests that the Work Plan include more information on approximate and/or maximum depths of borings.
13. **Page 4-1, Section 4.2.1**. The Work Plan states that the drilling waste will be disposed of on site near each borehole location. The impoundment is already capped and therefore nearby disposal may not be an appropriate method to dispose of waste. EPA suggests that waste management be reconsidered and further explained. See comment #5.
14. **Page 4-1, Section 4.2.2, second paragraph**, “Has the selection of borehole location been influenced by some consideration of the historical milling process? For example, do the borehole sites reflect a sampling of both the coarse sand-size fraction deposited near the tailings impoundments, as well as a representative sampling of the fine silty-clay size slimes from the historical froth flotation milling processes used during the operational history of this mill?”

The Work Plan states that borings to complete as monitoring wells will be selected in the field. It would be helpful to have an estimated number of boreholes to be completed as monitoring wells. It would also be helpful to better understand the criteria that will be used to make the determination. For example, will at least one boring be completed per impoundment?

15. **Page 4-1, Section 4.2.2, second paragraph**, “Can this key reference be provided as an appendix to this plan? The technical article was published in the Proceedings for the Tailings and Mine Waste Conference, 1997, and it is difficult to find in most technical libraries.”

16. **Page 4-2, Section 4.2.3** – Please explain the factors to decide which boreholes will be selected as monitoring wells. Also, please explain the factors considered in the selection of the borehole locations. On TP-1, the borehole locations all appear to be at the backside (mountain side) of the tailings impoundment – why not distributed across more of the tailings impoundment.
17. **Page 4-2, Section 4.2.4** – Please explain why monitoring wells will only be completed in native materials – is there a possibility that groundwater zones would be encountered within the tailings themselves that should be characterized?
18. **SOP No. 7, Section 1, paragraph 3.** The SOP references SOP No. 3 Storage and Disposal of Soil, Drilling Fluids, and Water Generated during field work. This SOP was not included in the work plan. Please include.
19. **SOP No. 7.** This is the SOP for decontamination of equipment. It is also referenced in the drilling SOP. The decon SOP suggests that all equipment will be washed with laboratory grade detergent, rinsed, and possibly acid rinsed. Is this the procedure that will be used for drilling equipment (rig, casing, tools, etc.)? The drilling SOP mentions that a steam cleaner should be brought on site. It is more typical to use steam to clean drilling equipment. EPA suggests either adding a steam cleaning procedure to the decon SOP, or clarifying that drilling equipment will also be cleaned with soap and water.
20. **SOP No. 8, Page 3.** The Work Plan states that the development water will be disposed of in a sediment basin located on the property. EPA requests additional details regarding the planned disposal of water that is likely impacted by Target Analytes. Additionally the SOP (No. 3) for Storage and Disposal of Soil, Drilling Fluids, and Water Generated during field work is not included.
21. **SOP No. 12.** This SOP is a general drilling SOP. However, it does not include information about roto sonic drilling. As this is a roto sonic effort, EPA suggests revising the SOP to include discussion of the technique.
22. **SOP No. 12, Page 6.** The final paragraph on this page states that filter sand will be tremied to fill the annular space to about ten feet above the top of the screen interval. Then, 2 sentences later it states that the filter pack will be added to a minimum of 2 feet above the top of the screen to a maximum of 5 feet. These sentences appear to contradict each other. EPA suggests revising the SOP to clarify how filter pack sand will be placed. Furthermore, EPA notes that it is typical to place 1-2 feet of sand above the screened interval not 2-10 feet.